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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,832	02/17/2006	Felix Kollmer	HH 307-KFM	4888

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EXAMINER	
JOHNSTON, PHILLIP A	

ART UNIT	PAPER NUMBER
2881	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,832	KOLLMER ET AL.	
	Examiner	Art Unit	
	PHILLIP A. JOHNSTON	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3-29-2010; 3-29-2010; 4-28-2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

1. This Office Action is submitted in response to the amendment filed 3-29-2010, wherein claims 1 and 6 have been amended. Claims 1-7 are pending.

Response to Arguments

2. Applicant's arguments filed 3-29-2010 have been fully considered but they are not persuasive.

3. The Applicant's arguments filed 3-29-2010 are directed against each prior art reference individually. Nowhere in the remarks filed 3-29-2010 has the applicant provided an argument against the combination of the Schultz, Orloff and Liebl references.

Pages 7-13 are directed against the Schultz reference separately concluding that the Shultz reference only teaches SIMS using an Au primary ion source.

Pages 13 and 14 are directed against the Orloff reference separately and the combination of Orloff and Schulz.

Page 15 is directed solely against the Liebl reference.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

For example, as described in the rejection mailed 12-3-2009, Shultz explicitly discloses at Col. 5, line 27-67 and Col. 6, line 1-47, using a SIMS instrument for obtaining mass spectra of secondary ions created during the bombardment of a solid sample by an energetic primary ion beam emitted from a liquid metal ion source, where the SIMS instrument was used to bombard

a sample with gold (Au) ions to examine the increased efficiency of secondary ion production resulting from bombarding the sample with gold (Au) ions of increasing size.

Orloff discloses at Col. 10, line 1-18, the element missing in Shultz; i.e., the liquid metal ion source that emits a Bismuth (Bi) ion beam for use as a bombarding ion source.

Lieble discloses at Col. 7, line 44-70, the element missing in the combination of Shultz and Orloff; i.e., the established scientific principle that ion bombardment induced secondary ion production increases with increasing atomic mass of the bombarding primary ion.

It would have been obvious to one of ordinary skill in the art at the time the invention was made that Schultz would use the Bismuth primary ion beam of Orloff since Bismuth has a higher mass than Gold, which would thereby increase the efficiency of secondary ion production from a sample, relative to bombardment of the sample with gold ions as predicted by Liebl.

The applicant has failed to present an argument against the rationale for combining the Schultz, Orloff and Liebl references.

Therefore, in light of the lack of an argument directed against the combination of the Schultz, Orloff and Liebl references, the examiner has concluded that the combination of the Schultz, Orloff and Liebl discloses the claimed invention as described in the rejection mailed 12-3-2009.

4. The Applicant argues at pages 10-12 that the Schultz reference does not teach the claimed "efficiency of secondary ion production", because it is defined in the instant application as; the secondary ion signal per consumed target material.

In response to this argument the examiner has noted that the feature upon which applicant relies (i.e., the secondary ion signal per consumed target material) is not recited in the

rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed Cir 1993).

5. The rejection of claims 1-7 are maintained.

6. All claims stand finally rejected.

Claims Rejection – 35 U.S.C. 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 6,989,528 to Schultz, in view of Orloff, USPN 4,426,582, and further in view of Liebl, USPN 3,508,045.

5. Regarding claims 1 and 6, Schultz teaches at Col. 5, line 46-67, a secondary ion mass spectrometer (SIMS) apparatus that includes;

(a) A liquid metal ion source (37) for irradiating sample (1) with primary ion beam (4) and creating secondary ion particles (note Figure 7; see Col. 8, line 48-67, and Col. 9, line 50-61), where a mixed ion beam is initially emitted by the ion source (37) containing metal cluster ions with various charge states and sizes (cluster statuses); for example, gold ions (Au_5^{n+}). Col. 5, line 46-63,

(b) A spectrometer unit, time of flight mass spectrometer (22) for detecting the generated secondary ions in a SIMS mode. Col. 8, line 48-67, and Col. 9, line 50-61,

(c) The mixed ion beam is filtered with a Wien filter to provide a mass pure primary ion beam (4) that includes only ions having a specific m/z at the target surface. See Col. 5, line 46-67 and Col. 9, line 50-61,

(c) Measuring efficiency of secondary ion emission for cluster sizes ranging from a singly charged single gold ion (Au^+) to multiply charged clusters having n atoms (Au_n^+). Col. 5, line 46-67.

Regarding the use of a Bismuth coated liquid metal ion source, Schultz discloses the use of a liquid metal source in a SIMS apparatus that produces a mass pure primary ion beam. Schultz also discloses that, although gold metal ions are shown in the example, it is stressed that other ions may also be used and are within the scope of the invention. Col. 5, line 45-48 and Col. 9, line 50-61.

Schultz fails to explicitly teach using a liquid-metal emitter coated with pure metallic Bismuth or of a low-melting-point alloy containing such that a Bismuth ion mixed beam can be emitted by the ion emitter under the influence of an electric field,

Orloff teaches a liquid metal ion source having emitter 11B, which is coated with liquid metal, such as Bismuth, where the liquid metal attains a very intimate, uniform wetting of the material of the emitter. See Col. 4, line 1-14; Col. 6, line 12-31; and Col. 7, line 62-67.

Orloff modifies Schultz to provide a simple drawn tungsten field emitter coated with Bismuth, with a variable emission current over the nanoamp to microamp range shown in Figures 2A, 2B and 3). See Col. 9, line 53-59.

Therefore, it would have been obvious to one of ordinary skill that Schultz would use the Bismuth coated emitter of Orloff to provide an ion source for producing high current, medium energy Bismuth ions. Col. 1, line 12-16.

Regarding increasing secondary ion production efficiency, Schultz measures the increased efficiency or yield of secondary ion production resulting from bombarding the sample with gold (Au) ions of increasing size such as ions ranging in size from Au_1^+ to Au_n^+. Col. 5, line 46-67.

The combination of Schultz and Orloff fails to disclose using Bismuth ions to increase the efficiency of secondary ion production from the sample, relative to bombardment of the sample with Au_1^+ gold ions.

Liebl discloses at Col. 7, line 44-46 that, in order to generate the maximum number of secondary ions, the mass of the primary ions should be as large as possible.

Liebl modifies the combination of Schultz and Orloff to provide empirical results that show secondary ion yield is directly proportional to mass of the primary ion and is supported by a theory that secondary ion emission is equivalent to the yield of sputtered particles which increases with the atomic mass of the primary ions and with their energies. Col. 7, line 50-70.

One of ordinary skill recognizes from the Lieble reference that Bismuth (Bi) has a higher atomic number than Gold (Au) and thus for the same charge and cluster state Bismuth has a higher atomic mass than Gold which would inherently produce a higher secondary ion yield than Gold.

Therefore it would have been obvious to one of ordinary skill in the art that Schultz would use the Bismuth primary ion beam of Orloff since Bismuth has a higher mass than Gold

and would thereby increase the efficiency of secondary ion production from a sample, relative to bombardment of the sample with gold ions as predicted by Liebl.

6. Regarding claim 2, the combination of Schultz, Orloff, and Liebl discloses a mass-pure primary ion beam of the Bi_n^{p+} ion type, described above regarding claims 1 and 6.

7. Regarding claim 3, Schultz teaches using a time-of flight, secondary ion mass spectrometer, described above regarding claims 1 and 6.

8. Regarding claim 4, the combination of Schultz, Orloff, and Liebl discloses a primary ion beam having the claimed beam current range, described above regarding claims 1 and 6.

9. Regarding claims 5 and 7, the combination of Schultz, Orloff, and Liebl discloses the claimed invention except a liquid metal ion source using a Bi-Pb alloy; however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a Bi-Pb alloy, since it have been held to be within the ordinary skill of worker in the art to select a known material on the basis of its suitability for the intended use. One would have been motivated to use a Bi-Pb alloy for the purpose of providing a source of Bismuth metal having a lower melting point and vapor pressure than pure Bismuth.

Conclusion

7. The Amendment filed on 3-29-2010 has been considered but is ineffective to overcome the references cited in the Office Action mailed 12-3-2009.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the

mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 7:30 am to 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor Robert Kim can be reached at (571) 272-2293. The fax phone number for the organization where the application or proceeding is assigned is 571 273 8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ
May 27, 2010

/ROBERT KIM/

Supervisory Patent Examiner, Art Unit 2881